CHAPTER 1: HOW TO USE GISST

This manual will give the user 1) background on some of the principles behind the development of GISST, 2) the main components of GISST so that those interested can create their own systems, 3) specific case studies of the application of GISST, and 4) references used in the development of GISST.

What is it?

GISST is a system that uses GIS coverages and imposes a scoring structure on this data so that decisions can be made. The tool is an environmental assessment identification and prioritization tool developed to provide a more systematic approach to considering single media and cumulative impacts in making environmentally sound decisions. It is designed to better understand the potential importance of single and cumulative effects and to facilitate communication of technical and regulatory data with industry, the public, and other stakeholders. The scoring structure consists of criteria, using 1 as low concern or vulnerability and 5 as high concern or vulnerability, based on available data sets and expert input. The scoring structure is further discussed in Chapter 3. These individual criterion scores can be compared among the base units one is interested in (e.g., watersheds, facilities, NEPA alternatives).

How is GISST different from other GIS tools?

GISST is different from other GIS tools in several ways, the most important of which is the scoring structure. Most GIS tools are used as mapping tools in which the user gets a map and then must decide what constitutes 'greater' or 'lesser' environmental concerns or vulnerability. Stakeholders and agency representatives know up front, what constitutes 'greater' or 'lesser' environmental concern

(both vulnerable areas and impacts), relatively. Therefore, GISST becomes an effective communication tool and can aid to streamline projects or program needs.

Most GIS tools are identification tools–showing where certain features are on the landscape like SEF or CrEAM. GISST is a prioritization tool–that is, given several options, which one has the least potential impact or is more vulnerable.

Who can use GISST?

Nearly anyone can use the GISST concept and apply it to their own program or project. Criteria can be developed at any time and are based on need and available data. If there is no criterion for a certain subject area, it can be created, then peer-reviewed. The contacts below can help you get started with this process.

How does it work?

The GISST equation has three parts, but can be modified, depending on project needs and data availability:

environmental vulnerability

environmental impact

geographic unit: point, line, or polygon (of the watershed, grid,project, etc.)

Chapter 3 describes the original algorithm in more detail and Appendix E describes the GIS programming necessary to implement GISST. The GISST algorithm has been modified for other

projects (see Chapter 4). GISST is flexible in that portions of the equation can be used or not, as appropriate. For example, a user may only want to determine the relative environmental vulnerability of two project sites or watershed subunits, or a user may want to know the potential impacts to those areas in addition to the environmental vulnerability. The user selects the appropriate criteria to use from Appendix C. Vulnerability criteria are averaged for a score (D_V) and the same occurs with the impact criteria (D_I). The final GISST score is a multiplication of D_V, D_I, and geographic unit. However, there are cases where a simple summation of the criteria scores provides a more appropriate assessment (e.g., cumulative impacts). The EPA Region 6 developers stress that the individual criterion scores are the most important in communicating environmental concerns, rather than final GISST scores.

What are the benefits?

There are several benefits that users have noted since GISST became available.

- Improved quality of review

  Comments can be compiled earlier, proactively, and are issue specific. Traditional NEPA comment letters can be generic in that they refer to regulations and not to information contained in the NEPA document. Scoping letters, in particular, are generic and do not refer to project specific information.

- Early actions driven by technological capabilities

  EPA has been criticized for accepting information and analysis from applicants and contractors without verifying the information appropriately.

- Wholesale approach

GISST allows us to serve more customers by getting more focused information to more people efficiently.

- Consistency

  GISST can develop into a region-wide capacity for high quality reviews and document preparation.

- Institutional knowledge base

  As staff retire or move to different jobs, knowledge of programs and regulations is lost. GISST criteria and scoring system capture this knowledge and enhance it through technology

- Screening level

  GISST is not time or labor intensive, but designed to point out 'red flags' to identify and prioritize where additional resources might be used or additional information and analysis is needed.

- Transparency

  GISST was developed in-house so users know how it works. One can compare this to purchased software packages that are 'black boxes' where a user enters information, but has no idea how the 'answer' is calculated. GISST users have more information on how each criterion is calculated and how it fits in with other criteria.

- Flexible

  New criteria can be added/changed as needed.

- Scaling

GISST can be applied to local projects encompassing one facility or to regional projects such as interstate highways.

What are the drawbacks?

GISST may cause an information overload. For example, if a user had five NEPA alternatives and used 40 GISST criteria, the resulting matrix can be quite large. This information is accessible approximately two hours after the GIS program is initiated. The EPA Region 6 developers stress looking for 'red flags'–criterion scores of '4' or '5' that might indicate an environmental problem or an accumulation of potential problems. Using GISST may increase workload because it is a wholesale approach. It takes approximately two hours to get a wealth of information that previously was not available or only available after weeks of data collection. Other drawbacks with GISST concern its reliance on available data, equally weighting data with different levels of QA, and mixing of data bases with different coverage accuracy and precision (county-level vs census block information). The GISST is a screening-level tool only. It does not replace traditional risk assessment or field investigations. It can only point the user in the direction of where problems are likely to happen or where resources should be directed for additional studies.

Who do I contact if I have further questions?

In general, you can contact any of the people listed below. However, each criterion in Appendices C and D lists specific EPA contacts and their email addresses.

Rhonda Smith	General	smith.rhonda@epa.gov

Gerald Carney	Toxicology	carney.gerald@epa.gov
Sharon Osowski	Ecology	osowski.sharon@epa.gov
David Parrish	GIS Coordinator	parrish.david@epa.gov